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OARSI OSTEOARTHRITIS RESEARCH SOCIETY INTERNATIONAL

Editorial

Ten recommendations for Osteoarthritis and Cartilage (OAC) manuscript preparation, common for all types of studies

The aim of these recommendations is a clear, complete, and unambiguous presentation of data, methods, and results. It is of paramount importance, and one of the tenets of good research that presented studies and experiments can be reproduced, and that the description of their outcome includes sufficient information to allow a reasonable assessment of unavoidable limitations and weaknesses. In one word: transparency. The purpose of the ten recommendations is to describe what information should be presented to the reader, and how, for facilitating his or her interpretation of the presented findings, not to specify how the authors should evaluate and interpret their data.

Additional guidelines and details are available for manuscripts presenting specific types of research, please refer to the Guide for Authors of Osteoarthritis and Cartilage for further information.

1. State the research question and the purpose of the study. Is the ambition to describe an observation, to generate hypotheses or to test a pre-specified hypothesis?
2. Describe the source of study participants, patients, cadavers, animals, tissues, cell lines, etc., and how many of these units that have been included in the study. What inclusion criteria did you use? How representative is your sample? To what population do you wish to generalize the findings of your study? Note that direct generalization to other cases than those studied requires information on the variability between independent cases. If all observations have been sampled from one subject, animal or cell line, direct generalization cannot be made beyond this.
3. When observations can be presented individually, either numerically or graphically, this should be preferred. In some cases such presentation could in itself be sufficient as a result presentation, in other cases it may complement the summary measures in the manuscript or in a web supplement. When fewer than four observations are presented, they should as a rule be described individually, not as an aggregate.
4. When presenting data in aggregated form, always provide the number of included observations (n) as well as measures of central tendency (mean, median, etc.) and dispersion (standard deviation, range, etc.). If repeated measurements or replicates are used, present both the number of independent samples and the number of repeated observations per independent sample.
5. Describe all statistical methods in the statistical methods section, using well recognized terms such as Student's or Satterthwaite's t-test rather than names that are unique to a particular statistical software package such as "independent groups t-test". You should always identify the statistical software and version used.
6. The validity of the results from statistical tests relies on certain assumptions being fulfilled. For example, Student's t-test is based on the assumptions of independent observations, Gaussian distribution and homogeneous variance. Describe in the statistical methods section whether you have examined if these assumptions are fulfilled, how you performed this investigation, and what the results were. When departures from the assumptions are detected, a change to an alternative method (for example a non-parametric) may be necessary to get valid results.
7. Generalizations from observed data are often made using hypothesis tests. The resulting P-values describe the inferential uncertainty in terms of risk of a false positive conclusion. It should be recognized that: (1) tested hypotheses always relate to the generalization of an observation, never to the observation itself, (2) that a statistically significant finding is not necessarily practically important, and (3) that a statistically insignificant test does not necessarily indicate similarity.
8. Generalizations from observed data can also be made using interval estimation. Confidence intervals provide more information on the inferential uncertainty than is included in a P-value because they describe a range of plausible and interpretable values, not just a probability. It is important to recognize that this range of plausible values represents the uncertainty in a generalization, not the dispersion of observed data. While standard deviations and ranges can be used to describe dispersion, confidence intervals and standard error of the means represent uncertainty. When this uncertainty is presented in text and tables, or graphically with error bars, Osteoarthritis and Cartilage recommends using 95% confidence intervals instead of $\pm$S.E.M.
9. If one-sided statistical tests, one-sided confidence intervals, Bonferroni corrections, simultaneous confidence intervals, or other departures from the conventional 5% significance and 95% confidence level are used, explain and motivate your reasons for this.
10. The level of statistical rigor (and remaining inferential uncertainty in the results) should be in parity with the purpose of the study and the author's conclusions. For example, a confirmatory randomized clinical trial has little room for multiplicity issues arising from the testing of multiple endpoints. If such issues exist, they should be properly addressed already in the design of the trial. Hypothesis generating studies, on the other hand, can be analyzed without concerns for multiplicity, and

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case-reports (studies with very small n) may be entirely descriptive with no need for evaluation of inferential uncertainty. A brief description of the analysis strategy in the statistical methods section will facilitate the reading of the manuscript. Authors are strongly recommended to save statistical code, output from data analyses, and raw data and raw images for possible review, should the editors request this.

Adherence to these recommendations will greatly facilitate the review of your manuscript, decrease the likelihood of multiple revisions, and improve the chances of acceptance for publication.

The editors recognize that the recommendations summarized above will benefit from additional explanations, examples and discussion. We therefore aim to expand on these topics in future issues of Osteoarthritis and Cartilage.

Author contributions

Both authors contributed to writing and editing of the manuscript, and approved the final submitted manuscript.

Conflict of interest

The authors are deputy editor for statistics (JR) and editor-in-chief (LSL) for Osteoarthritis and Cartilage, and declare no conflict of interest.

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Further reading

1. Cumming G, Fidler F, Vaux DL. Error bars in experimental biology. J Cell Biol 2007;177:7–11.
2. Vaux D. Ten rules for the presentation and interpretation of data in scientific publications. Australian Biochemist 2008;39: 37–9.
3. Ranstam J. Sampling uncertainty in medical research. Osteoarthritis Cartilage 2009;17:1416–9.
4. Ranstam J. Reporting laboratory experiments. Osteoarthritis Cartilage 2010;18:3–4.
5. Ranstam J, Lohmander LS. What's in a number or in a picture? Osteoarthritis Cartilage 2010;18:1003–5.

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